

WHAT IS CLAIMED IS:

1. An internal multi-band antenna with multiple layers for use in a portable terminal, comprising:

5 a main radiation patch for forming an upper side of the antenna, one side of the main radiation patch connected to a feeder, the main radiation patch including a plurality of strips in the same plane and formed by a folded slit patch of maze type; and

10 at least one auxiliary radiation patch bent downwardly at one side of an edge of the main radiation patch and formed in parallel to the main radiation patch between the main radiation patch and a feeder ground plane.

15 2. The internal multi-band antenna according to claim 1, further comprising:

a feeder connected to one side of the main radiation patch for transmitting receive signals of the antenna and radiation signals of a body of the portable terminal;

20 a feeder extension extending vertically from a predetermined position in a longitudinal direction of the feeder; and

an inverted Y type feeder structure formed by a feeder ground bent at an end of the feeder extension and
25 contacting a ground plane.

3. The internal multi-band antenna according to claim 2, further comprising:

a ground metal plate in contact with the feeder ground;

5 a metal conductor for feeding formed in such a manner that the metal conductor for feeding is isolated from the ground metal plate, one side of the metal conductor for feeding connected to the feeder and the other side of the metal conductor for feeding connected to a signal line of
10 the body of the portable terminal;

an insulating plate provided at a lower side of the ground metal plate and having a plurality of via holes penetrating the insulating plate in a width direction, inner surfaces of the via holes coated with conductors; and

15 a PCB provided at a lower side of the insulation plate and including a lower metal plate electrically connected to the ground metal plate through the via holes of the insulation plate and the inner coated conductors.

20 4. The internal multi-band antenna according to any one of claims 1 to 3, wherein the auxiliary radiation patch is bent inwardly.

5. An internal multi-band antenna with multiple
25 layers for use in a portable terminal, comprising:

a feeder for transmitting receive signals of the antenna and radiation signals of a body of the portable terminal;

5 a feeder extension extending vertically from a predetermined position in a longitudinal direction of the feeder; and

an inverted Y type feeder structure formed by a feeder ground bent at an end of the feeder extension and contacting a ground plane.

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6. The internal multi-band antenna according to claim 5, further comprising:

15 a main radiation patch for forming an upper side of the antenna, one side of the main radiation patch connected to the feeder, the main radiation patch including a plurality of strips in the same plane and formed by a folded slit patch of maze type;

20 at least one striped auxiliary radiation patch provided in parallel to the main radiation patch between the main radiation patch and a feeder ground plane; and

a dielectric layer inserted between the main radiation patch and the auxiliary radiation patch and having via holes penetrating downwardly from one side of an edge of the main radiation patch and connected to one side
25 of an edge of the auxiliary radiation patch, wherein inner

surfaces of the via holes are coated with conductive material for connecting the main radiation patch with the auxiliary radiation patch.

5 7. The internal multi-band antenna according to claim 6, further comprising:

 a ground metal plate in contact with the feeder ground;

 a metal conductor for feeding formed in such a manner
10 that the metal conductor for feeding is isolated from the ground metal plate, one side of the metal conductor for feeding connected to the feeder and the other side of the metal conductor for feeding connected to a signal line of the body of the portable terminal;

15 an insulating plate provided at a lower side of the ground metal plate and having a plurality of via holes penetrating the insulating plate in a width direction, inner surfaces of the via holes coated with conductors; and

 a PCB provided at a lower side of the insulation
20 plate and including a lower metal plate electrically connected to the ground metal plate through the via holes of the insulation plate and the inner coated conductors.

 8. The internal multi-band antenna according to claim
25 6 or 7, wherein the auxiliary radiation patch is bent

inwardly.

9. An internal multi-band antenna with multiple layers for use in a portable terminal, comprising:

5 a feeder connected to one side of the antenna;
a ground metal plate in contact with a portion of an end of the feeder;

a metal conductor for feeding formed in such a manner that the metal conductor for feeding is isolated from the
10 ground metal plate, one side of the metal conductor for feeding connected to the feeder and the other side of the metal conductor for feeding connected to a signal line of a body of the portable terminal;

a parasite element provided in the vicinity of the
15 metal conductor for feeding and connected to the feeder for adjusting an input impedance of the feeder in order to minimize a return loss;

an insulating plate provided at a lower side of the ground metal plate and having a plurality of via holes
20 penetrating the insulating plate in a width direction, inner surfaces of the via holes coated with conductors; and

a lower metal plate provided at a lower side of the insulation plate and electrically connected to the ground metal plate through the via holes of the insulation plate
25 and the inner coated conductors.